pour their waters into these gulfs, and in both raise the tide to the extraordinary elevation of forty-seven feet. From the Land's End to the meeting of these streams in one case is seventy-five miles, and in the other the same.

In one channel, at Courtown, a little way above the contraction, and at 150 miles from the entrance, there is little or no rise of the water; and in the other, about Swanage, at the same distance from the entrance, there is but a small rise of tide also (five feet at springs). In both cases these spots are the node or hinge of the tide-wave, on either side of which the times of high water are reversed. And again, near the virtual head of the tide, in both cases there is an increased elevation of the water on the south-east side of the channel of about one-third of the column; the rise at Liverpool being thirty-one feet, and at Cayeux thirty-four feet.

The author traces a further identity in the progress of the tide-wave along the sides of both channels *opposite to that of the node.* In the first part of the channel the wave in each travels at about fifty miles per hour; in the next, just above the node, this rate is brought down to about thirty miles per hour in one, and to sixteen miles in the other; it then in both becomes accelerated, and attains to about seventy-six miles per hour.

Lastly, the author observes that the node or hinge of the tide, placed by Professor Whewell (in his papers on the Tides) in the North Sea, is situated at the same distance nearly from the head of the tide off Dungeness, as the node near Swanage is on the opposite side of it; and that in the Irish Channel, at the same distance nearly as the node at Courtown is from the head of the tide off Peel, there is a similar spot of no rise recently observed by Captain Robinson.

The author concludes this paper by urging a further investigation of the tidal phenomena of the English Channel, on the ground of the great advantage navigation, as well as science in general, would derive from such an examination.

Captain Beechey's letter is illustrated by twelve charts and diagrams, showing the identity and singular phenomena of these two great channels.

March 23, 1848.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

"Observations on some Belemnites and other fossil remains of Cephalopoda, discovered by Mr. Reginald Neville Mantell, C.E., in the Oxford Clay, near Trowbridge in Wiltshire." By Gideon Algernon Mantell, Esq., LL.D., F.R.S., Vice-President of the Geological Society.

The author states, that a line of railway now in progress of construction to connect the large manufacturing town of Trowbridge with the Great Western, being part of the Wilts, Somerset, and

Weymouth line, traverses extensive beds of the Oxford clay of the same geological character as those at Christian-Malford in the same county, which furnished the remarkable fossil cephalopods described by Mr. Channing Pearce under the name of *Belemnoteuthis*, and by Professor Owen (in a memoir which received the award of a Royal Medal of this Society), as the animals to which the fossils commonly known by the name of *Belemnites* belong.

The son of the author, Mr. R. N. Mantell, being engaged in these works under the eminent engineer Mr. Brunel, availed himself of the opportunity to form an extensive and highly interesting collection of the fossils of the Oxford clay, and other oolitic deposits cut through or exposed by the engineering operations. Among those transmitted to the author are many illustrative examples of Belemnoteuthes and Belemnites; some of which confirm the opinions entertained by the late Mr. C. Pearce, Mr. Cunnington, and other competent observers, that the body and soft parts, with the cephalic uncinated arms, &c. of cephalopods, obtained from Christian-Malford by the Noble President and Mr. Pearce Pratt, and referred by Professor Owen in the memoir above-mentioned to the Belemnite, belong to a distinct genus—the Belemnoteuthis.

The author describes and figures several perfect examples of the phragmocone of the Belemnoteuthis, and institutes a comparison between them and a beautiful example of the phragmocone of a belemnite occupying the alveolus of the guard; and defines the essential differences observable in the form and structure of these chambered calcareous cones. He especially points out as distinctive characters of the phragmocone of the Belemnoteuthis, two flat longitudinal ridges which extend upwards from the apical extremity, and the granulated and striated external surface of the epidermis. The phragmocone of the Belemnite has a smooth surface, is destitute of any longitudinal ridges, and terminates at the apex in a very fine point, the axis being in an oblique direction.

The author next describes a remarkable specimen of a Belemnite, twenty-two inches in length, in which the osselet or guard, phragmocone, and capsule or receptacle, are preserved in connexion. In this fossil is demonstrated, for the first time, the upper or basal termination of the phragmocone, with two elongated calcareous processes extending upwards from the margin: these are analogous in form and position to the prolongations from the peristome of the outer chamber of certain Ammonites, as for example, in *A. Jasoni*. In the phragmocone of the Belemnoteuthis the peristome is entire.

Another interesting part of the structure of the Belemnite, not previously detected, is also shown in the same specimen, as well as in many other examples found in the Oxford clay near Trowbridge; namely, a calcareous shelly periosteum or capsule, which invests the guard, and expands upwards into a horny sheath or receptacle, that surrounds the basal chamber of the phragmocone in which the viscera were probably contained. This receptacle was formerly supposed to originate from within the alveolus of the guard. Mr. Miller, many years ago, inferred the existence of a vascular integument around

the guard from the meandring impressions of blood-vessels observable on the surface of some specimens; but the presence of a calcareo-corneous capsule or sheath investing the guard, and expanding into a horny receptacle, has not till now been demonstrated.

The author considers the facts described as proving that the cephalopod of the Belemnite was entirely distinct from the Belemnoteuthis; and that the muscular mantle, cephalic arms, and other parts referred by Professor Owen to the former, exclusively belong to the latter genus.

He concludes that the remains of at least three genera of naked Cephalopoda occur in the argillaceous deposits of the oolite in Wiltshire; namely, the first or true *Calamary*, with a horny dorsal gladius or pen; the second, the *Belemnoteuthis*, or a decapod with uncinated cephalic arms, ink-bag, pallial fins, and a corneo-calcareous phragmocone; and the third, the *Belemnite*, which possessed a phragmocone having the apical part implanted in the cavity or alveolus of a guard or osselet, which in its original state resembled in substance the sepiostaire of the Cuttle-fish, but is generally found mineralized by calcareous spar; and the peristome, possessing two or more elongated shelly processes; both the guard and the phragmocone being invested with a corneo-calcareous capsule or receptacle. He observes, lastly, that the body and other soft parts of the cephalopod of the Belemnite are at present unknown. The author's communication was illustrated by drawings, and accompanied by the specimens above described.

March 30, 1848.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

Professor Ritter, of Berlin, and M. Milne Edwards, of Paris, were elected Foreign Members.

"Chemical Researches on the Nature of Wax." By Benjamin Collins Brodie, Esq. Communicated by Sir Benjamin Collins Brodie, Bart., F.R.S.

It is known that bees'-wax is separable, by means of boiling water, into two portions: to the one, which is more soluble in alcohol than the other portion, the name of *Cerin* has been given: the residuary portion, which does not dissolve, has been termed *Mycicin*. In this paper the author gives an account of his investigation of the properties of the former of these substances, namely Cerin.

This substance has been represented by certain chemists in France, M. Lewy and M. Gerhardt, as being convertible by oxidation into the stearic acid, and as being a substance which stands with respect to that acid in the remarkable relation of an aldehyde. These views the author believes are incorrect; and he states that no pure chemical substance was procured by these chemists from cerin, and that the